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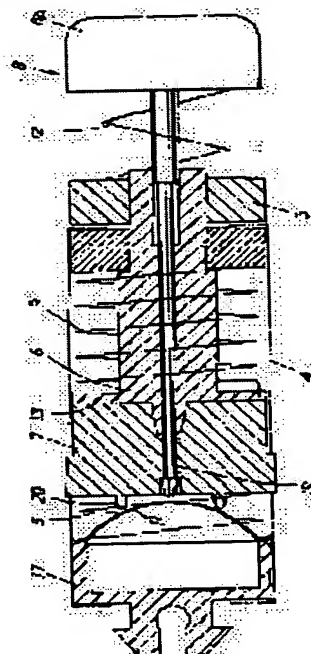
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(54) HINGE DEVICE, AND PORTABLE ELECTRONIC APPLIANCE USING THE HINGE DEVICE

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a portable electronic appliance which is urged to close and automatically opened and turned in one operation, or manually opened/ closed in a free-stop state in which a hinge device is turned and stopped at the hand-free position if this one operation is not performed.

**SOLUTION:** The engagement of an engagement projecting part 6 with an engagement recessed part 7 is not attached/detached, but held in a turn-locking state by an elasticity mechanism 11, and if the engagement is attached/detached by the manual turn against the elasticity mechanism 11, a free-stop state is realized, in which the hinge device is turned and stopped at the hand-free position by the returning force by the elasticity mechanism 11. The hinge device has an unlocking part 8 in which the engagement energizing force of the elasticity mechanism 11 is released, any one of the engagement projecting part 6 and the engagement recessed part 7 is automatically turned by a turning and energizing mechanism 9, and a second member 2 is automatically and relatively turned to a first member 1.



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## CLAIMS

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### [Claim(s)]

[Claim 1] Are hinge equipment which pivots the part I material and the part II material, and engagement heights are prepared in a baffle condition to this part I material or the part II material. The engagement crevice which engages with a baffle condition to another side at these engagement heights is prepared. When these engagement heights and an engagement crevice are in an engagement condition, while constituting so that the rotation lock of the part I material and the part II material may be carried out and preparing at least one side of these engagement heights and an engagement crevice in the engagement estrangement direction free [ slide migration ] The elastic device energized in the engagement direction when at least one side of these engagement heights and an engagement crevice is moved in the estrangement direction, While constituting so that it may have the rotation energization device which energizes at least one side of engagement heights and an engagement crevice in the rotation direction, and the engagement to said engagement heights and engagement crevice may not engage and release according to said elastic device but said rotation lock condition may be held When resist an elastic device by hand, it is made to rotate and this engagement is made to engage and release It constitutes so that it may be in the fleece top condition which carries out a rotation halt in the location which lifted the hand by the return thrust by this elastic device. Hinge equipment characterized by having the lock discharge control unit which makes the engagement energization force of said elastic device cancel, rotates engagement heights or an engagement crevice automatically according to said rotation energization device, and carries out relative rotation of said part II material automatically to said part I material.

[Claim 2] Said elastic device is hinge equipment of description and \*\*\*\* claim 1 publication about having constituted from a swelling tabular friction spring which carries out suppression bearing in case slide migration of said engagement heights or said engagement crevice is carried out in the estrangement direction.

[Claim 3] Said lock discharge control unit is hinge equipment according to claim 2 carry out having constituted so that press deformation of said friction spring might be carried out in said estrangement direction by carrying out push discharge actuation, and the return thrust of this friction spring used as said engagement energization force might not work to said engagement heights or the engagement crevice which carries out estrangement migration on the occasion of engaging-and-releasing rotation but the automatic rotation by said rotation energization device might be approved as the description.

[Claim 4] Said lock discharge control unit pushes the center section which bulged in the shape of [ of the friction spring adopted as said elastic device ] a dome, and it constitutes it so that it may be made to deform in said estrangement direction. In case said engagement heights or an engagement crevice carries out estrangement migration on the occasion of engaging-and-releasing rotation Hinge equipment given in any 1 term of claims 1-3 characterized by constituting so that not the center section that bulged in the shape of [ of said friction spring ] a dome but a periphery may be made to push and transform and suppression bearing of these engagement heights or the engagement crevice may be carried out.

[Claim 5]

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the pocket type electronic equipment which used hinge equipment for the hinge equipment list which pivots the part I material and the part II material.

[0002]

[Description of the Prior Art] For example, in the pocket type telephone as an example of a type of pocket type electronic equipment, the type is the flip type with which the flip was attached in the body of pocket type telephone free [ closing motion ], and really without a flip known. Although the type exceeds in respect of lightweight-izing and convenience, in points, such as the versatility of malfunction prevention of a switch, miniaturization, and a design, the flip type really exceeds.

[0003] In the pocket type electronic equipment of the type equipped with such a flip, it is requested that a flip is simply opened and closed at an one-touch ceremony.

[0004] However, since drives, such as a carbon button for canceling the rotation lock device and lock of a flip, were needed separately [ hinge equipment ] when conventional hinge equipment was applied to connection of the flip to the body of pocket type telephone, problems, like there is the need of components mark increasing and providing the tooth space for it had arisen.

[0005] Then, though it was the configuration which can be opened and closed by one-touch as shown in WO 00/50780 official report by which international disclosure was carried out, these people made it unnecessary to prepare the special device for a closing motion lock in a device side, and developed the hinge equipment which can be contributed to the simplification of the configuration of pocket type electronic equipment, and space-saving-ization.

[0006] With this equipment, when it applies, for example to flip type pocket type telephone as mentioned above, the flip by which lock out energization is carried out is considering as the configuration which carries out open rotation at once automatically only by pushing with a finger the discharge control unit (pushing carbon button) prepared in this hinge equipment.

[0007] The hinge equipment which achieves this automatic closing-motion function was epoch-making hinge equipment which realizes structure which carries out automatic closing motion by one-touch, though the lock-out energization function achieved, but when this one-touch function is not used, but the flip by which lock-out energization is carried out can rotate free by hand and a hand releases, these people found [ that it is further easy the direction / made / it / stop in that rotation location / using, and ] out.

[0008] namely , be very easy use , constitute [ open and close by hand , and ] so that it may be in the fleece top condition which carry out a rotation halt in the location turned a hand to a location in that case , when perform this one-touch control , although amelioration be add further , lock out energization be carry out and open rotation be automatically carry out by one-touch control in consideration of such a situation , and this invention aim at provide the pocket type electronic equipment which used in hinge equipment to an epoch-making hinge equipment list .

[0009]

[Means for Solving the Problem] The summary of this invention is explained with reference to an accompanying drawing.

[0010] Are hinge equipment which pivots the part I material 1 and the part II material 2, and the engagement heights 6 are formed in a baffle condition to this part I material 1 or the part II material 2. The engagement crevice 7 which engages with a baffle condition to another side at these engagement heights 6 is formed. When these engagement heights 6 and the engagement crevice 7 are in an engagement condition, while constituting so that the rotation lock of the part I material 1 and the part II material 2 may be carried out and preparing at least one side of these engagement heights 6 and the engagement crevice 7 in the engagement estrangement direction free [ slide migration ] The elastic device 11 energized in the engagement direction when at least one side of these engagement heights 6 and the engagement crevice 7 is moved in the estrangement direction, While constituting so that it may have the rotation energization device 9 which energizes at least one side of the engagement heights 6 and the engagement crevice 7 in the rotation direction, and the engagement to said engagement heights 6 and engagement crevice 7 may not engage and release according to said elastic device 11 but said rotation lock condition may be held When resist the elastic device 11 by hand, it is made to rotate and this engagement is made to engage and release It constitutes so that it may be in the fleece top condition which carries out a rotation halt in the location which lifted the hand by the return thrust by this elastic device 11. The engagement energization force of said elastic device 11 is made to cancel. The hinge equipment characterized by having the lock discharge control unit 8 which rotates automatically the engagement heights 6 or the engagement crevice 7 according to said rotation energization device 9, and carries out relative rotation of said part II material 2 automatically to said part I material 1 is started.

[0011] Moreover, in case said elastic device 11 carries out slide migration of said engagement heights 6 or said engagement crevice 7 in the estrangement direction, it starts [ having constituted from a swelling tabular friction spring 11 which carries out suppression bearing, and ] the hinge equipment of description and \*\*\*\* claim 1 publication.

[0012] Moreover, said lock discharge control unit 8 carries out the press deformation of said friction spring 11 in said estrangement direction by carrying out push discharge actuation, and the return thrust of this friction spring 11 used as said engagement energization force starts in it having constituted so that it may not work to said engagement heights 6 or the engagement crevice 7 which carries out estrangement migration on the occasion of engaging-and-releasing rotation but the automatic rotation by said rotation energization device 9 may be approved to the hinge equipment according to claim 2 carry out as the description.

[0013] Moreover, said lock discharge control unit 8 pushes the center section which bulged in the shape of [ of the friction spring 11 adopted as said elastic device 11 ] a dome, and it constitutes it so that it may be made to deform in said estrangement direction. In case said engagement heights 6 or the engagement crevice 7 carries out estrangement migration on the occasion of engaging-and-releasing rotation It is not the center section which bulged in the shape of [ of said friction spring 11 ] a dome, and hinge equipment given in any 1 term of claims 1-3 characterized by constituting so that a periphery may be made to push and transform and suppression bearing of these engagement heights 6 or the engagement crevice 7 may be carried out is started.

[0014] Moreover, said lock discharge control unit 8 is constituted from pushing carbon button section 8A and an actuation shaft 19. It constitutes so that press deformation of the center section of the friction spring 11 adopted as said elastic device 11 with the actuation shaft 19 which carries out movable by pushing this pushing carbon button section 8A may be carried out in said estrangement direction and said rotation lock condition may cancel. When the engagement crevice 7 deserts relatively to the engaging-and-releasing heights 6 because carry out relative rotation of said engagement crevice 7 by hand to said engagement heights 6 and engagement to the engagement heights 6 and the engagement crevice 7 engages and releases, The back configuration of the engagement heights 6 or the engagement crevice 7 or the swelling configuration of the friction spring 11 is set up so that the engagement heights 6 which desert, or the engagement crevice 7 may carry out press deformation of the not a center section but

periphery of said friction spring 11. When the return thrust of said friction spring 11 is set as sufficient strength to realize said fleece top condition, the push discharge operating physical force by said lock discharge control unit 8 Even if weaker than the case where the friction spring 11 is pressed in the engagement heights 6 or the engagement crevice 7, hinge equipment given in any 1 term of claims 1-4 characterized by setting up so that press deformation of said friction spring 11 may be carried out and said rotation lock condition can be canceled is started.

[0015] Moreover, it constitutes so that engagement to said engagement heights 6 and said engagement crevice 7 may not engage and release, unless predetermined distance press deformation of said elastic device 11 is carried out. Even if the apical surface of the engagement heights 6 and the top-face section 13 of the engagement crevice 7 carry out a pressure welding by the return thrust of the engaging-and-releasing backward aforementioned elastic device 11 and the rotation energization force by said rotation energization device 9 arises, it will be in said fleece top condition. By carrying out predetermined distance press deformation, said elastic device 11 by push discharge actuation of said lock discharge control unit 8 So that said part II material 2 may carry out relative rotation automatically to said part I material 1 to a predetermined include angle, without engagement to said engagement heights 6 and said engagement crevice 7 engaging and releasing according to said rotation energization device 9, and being in a fleece top condition Hinge equipment given in any 1 term of claims 1-5 characterized by constituting is started.

[0016] Moreover, the end face section comrade of said part I material 1 and said part II material 2 is pivoted. Both sides are hinge equipment which can open and close the part I material 1 or the part II material 2 in the open condition rotated to the predetermined disconnection include angle from the state of obstruction which carried out the polymerization. At least At the time of said state of obstruction It will be in said rotation lock condition that said engagement heights 6 and said engagement crevice 7 were engaged. Rather than the rotation energization force by said rotation energization device 9 Set up so that the cam force in which said engagement heights 6 and said engagement crevice 7 tend to be engaged according to the engagement energization device 5 established independently [ said elastic device 11 or this elastic device 11 ] may become large, and it constitutes so that lock out energization of said part II material 2 may be carried out to a predetermined rotation include angle to said part I material 1. Said part II material 2 carries out [ the engagement heights 6 ] relative rotation automatically to said part I material 1 to said engagement crevice 7 to said predetermined disconnection include angle by actuation of said lock discharge control unit 8. Said predetermined disconnection include angle can carry out relative rotation of said part II material 2 from said state of obstruction by hand to said part I material 1. And [ to / from said predetermined rotation include angle by which lock out energization is carried out / said predetermined disconnection include angle or near it ] Hinge equipment given in any 1 term of claims 1-6 characterized by constituting so that it may become the fleece top field which carries out a rotation halt in the location which detached \*\*\*\* is started.

[0017] Moreover, the end face section comrade of said part I material 1 and said part II material 2 is pivoted. Both sides are hinge equipment which can open and close the part I material 1 or the part II material 2 in the open condition rotated to the predetermined disconnection include angle from the state of obstruction which carried out the polymerization, and set at said predetermined disconnection include angle. Hinge equipment given in any 1 term of claims 1-7 characterized by constituting so that said engagement heights 6 and said engagement crevice 7 may be engaged again and may be in said rotation lock condition is started.

[0018] Moreover, the first connection section 3 which is hinge equipment which pivots the part I material 1 and the part II material 2, and is connected with said part I material 1, The engagement crevice 7 which engages with the engagement heights 6 by which engagement energization is carried out when it has the second connection section 4 connected with said part II material 2 and moves in the estrangement direction according to said elastic device 11 at this first connection section 3 and the second connection section 4, and these engagement heights 6 is formed. The rotation lock of said first connection section 3 and second connection section 4 is carried out because these engagement heights 6 and the engagement crevice 7 will be in an

engagement condition. Said part I material 1, constitute so that the rotation lock of said part II material 2 may be carried out, and resist said elastic device 11 and at least one side of these engagement heights 6 and the engagement crevice 7 is prepared in the estrangement direction free [ slide migration ]. It constitutes so that said engagement may engage and release by resisting said elastic device 11 and making at least one side of the engagement heights 6 in an engagement condition, and the engagement crevice 7 desert according to this elastic device 11 and said rotation lock condition may be canceled. While establishing the rotation energization device 9 which carries out rotation energization at least of one side of said engagement heights 6 and the engagement crevice 7 Even if rotation energization is carried out by said rotation energization device 9, the configuration of said engagement heights 6 and engagement crevice 7 The engagement heights 6 and the engagement crevice 7 are engaged by engagement energization being carried out by the engagement energization device 5 established independently [ said elastic device 11 or this elastic device 11 ], and said rotation lock condition is held. By actuation of said lock discharge control unit 8 By canceling the engagement energization by said elastic device 11, according to said rotation energization device 9 Hinge equipment given in any 1 term of claims 1-8 characterized by constituting so that the engagement heights 6 may carry out relative rotation automatically and may stop to a predetermined disconnection include angle automatically to the engagement crevice 7 is started. [0019] Moreover, the pocket type electronic equipment using the hinge equipment characterized by forming hinge equipment given in any 1 term of said claims 1-9 in the pivoting section is started.

[0020] moreover, said part I material 1 — in the pivoting section pivoted so that the body section as \*\*\*\*\* part II material 2, the covering device as said part II material 2 which carries out a polymerization to this, or said part I material 1, or a flip can be opened and closed from a polymerization condition to a predetermined disconnection include angle The pocket type electronic equipment using the hinge equipment according to claim 10 characterized by using the hinge equipment of a publication for any 1 term of said claims 1-9 is started.

[0021]

[Embodiment of the Invention] The operation effectiveness is shown based on a drawing, and the gestalt (how does it invent?) of operation of this invention it is considered that is suitable is explained briefly.

[0022] The rotation lock of the part I material 1 and the part II material 2 is carried out by the engagement heights 6 and the engagement crevice 7 being engaged. When it is going to engage and release at least, in order that either may resist the elastic device 11 and may move in the estrangement direction in these engagement heights 6 and the engagement crevice 7, even if rotation energization is carried out according to the rotation energization device 9 at least by the return thrust by this elastic device 11, the rotation lock condition that the engagement heights 6 and the engagement crevice 7 were engaged is held.

[0023] Namely, it sets to the state of obstruction in which the part I material 1 and the part II material 2 carried out the polymerization, for example. When it is made to be in the condition that the engagement heights 6 and the engagement crevice 7 were engaged, Unless it rotates to the location where the engagement heights 6 and the engagement crevice 7 engage and release at least, for example according to the engagement cam force of the engagement heights 6 and the engagement crevice 7 as for which engagement energization is carried out by the engagement energization device 5 established independently [ the elastic device 11 or this elastic device 11 ], lock out energization will be carried out. Moreover, in case it engages and releases, the return thrust by the elastic device 11 arises.

[0024] In this rotation lock condition by which engagement energization is carried out, if the lock discharge control unit 8 is operated For example, if the lock discharge control unit 8 used as the pushing carbon button is pushed in and operated As opposed to the engagement heights 6 by which engagement energization of the elastic device 11 stops working on the occasion of engaging and releasing, and rotation immobilization is carried out to the part I material 1 Since estrangement of the engagement crevice 7 by which rotation immobilization is carried out to the part II material 2 is attained, it becomes rotatable (in the example, the engagement energization

force of the engagement energization device 5 is committed). The engagement crevice 7 by which rotation energization is carried out rotates according to the rotation energization device 9, the engagement crevice 7 rotates to the engagement heights 6, and said rotation lock condition is canceled.

[0025] That is, the part II material 2 carries out relative rotation at once automatically to for example, a predetermined disconnection include angle to the part I material 1 by one-touch discharge actuation of the lock discharge control unit 8.

[0026] When not performing this one-touch discharge actuation, but resisting the elastic device 11 by hand on the other hand and carrying out relative rotation of the part II material 2 to the part I material 1, it rotates the engagement crevice 7 resisting the elastic device 11, and carrying out estrangement migration to the engagement heights 6, and engagement to the engagement heights 6 and the engagement crevice 7 engages and releases.

[0027] Furthermore, when carrying out relative rotation of the part II material 2 by hand, the predetermined disconnection include angle with which the engagement heights 6 and the engagement crevice 7 engage again by the return thrust of the elastic device 11, for example will be in the fleece top condition by which halt maintenance is carried out in the location to which the hand was turned.

[0028] Therefore, can carry out one-touch automatic rotation by the lock discharge control unit 8, and When relative rotation of the part II material 2 can be carried out to the part I material 1 by hand and it moreover carries out relative rotation by this hand The part II material 2 is not unsteady to the part I material 1, and the fleece top condition stopped in the location to which the hand was turned can be realized until it will be again engaged if lock out energization is carried out and it engages and releases until engagement to the engagement heights 6 and the engagement crevice 7 engages and releases for example.

[0029] Moreover, although contact pressure (strong return thrust) strong against realizing the fleece top is needed, since the friction spring 11 is especially adopted as an elastic device 11 by invention according to claim 2, the strong contact pressure which realizes the fleece top with a simple configuration can be obtained.

[0030] Moreover, although the push discharge operating physical force of the lock discharge control unit 8 which vanishes return thrust of this elastic device 11 conversely (discharge) will become powerful and the strong pushing force will moreover be needed for one-touch discharge by this invention if the elastic device 11 is constituted, for example from a coil spring etc. The push discharge actuation by this point lock discharge control unit 8 The dome mold swelling tabular friction spring 11 with which the center bulged as an elastic device 11 is adopted. It writes as the configuration make it make it not commit, so that press this center section, it is made to fully deform and return thrust prevents rotation to the engagement heights 6 or the engagement crevice 7. The return thrust when enabling it to perform the lock discharge control unit 8 by light press actuation of a finger, since deformation by press in a center section can be performed by the weak force, rotating by hand on the other hand, and realizing the fleece top Since it constituted so that the engagement heights 6 which desert, or the engagement crevice 7 might be made to press and transform not a center section but the periphery of the friction spring 11, strong sufficient return thrust to realize the fleece top can be obtained.

[0031] Therefore, although lock out energization is carried out and open rotation is automatically carried out by one-touch control When not performing this one-touch control, it can open and close by hand, and in that case, it is very easy to use, constituting so that it may be in the fleece top condition which carries out a rotation halt in the location to which the hand was turned, and, moreover, is using the friction spring 11. Since it is considering as the configuration changed in the time of the press discharge for automatic rotation of the press location to the friction spring 11, and the fleece top while it is realizable with a still simpler configuration, Though it has the strong spring force in which the fleece top is realizable, the pocket type electronic equipment which used hinge equipment for the epoch-making hinge equipment list which can perform one-touch discharge actuation by the light force with a finger can be offered.

[0032]

[Example] The concrete example of this invention is explained based on a drawing.



[0033] This example is a thing at the time of applying to pocket type telephone, as shown in a drawing, and it has applied the hinge equipment of this invention to the pivoting structure which can make flip 2 the open condition (call location) rotated to 120 degrees from the state of obstruction in which made the body section the part I material 1, and made the flip the part II material 2, and the body section 1 and flip 2 carried out the polymerization.

[0034] And it sets to the state of obstruction of the rotation lock condition by which lock out energization is carried out as mentioned above. Without flip 2 rotating and stopping to a predetermined disconnection include angle (for example, 120 degrees) at once automatically and operating this lock discharge control unit 8, if push actuation of the lock discharge control unit 8 (release button) is carried out When flip 2 can be rotated by hand and it rotates flip 2 by hand Few rotation include angles which this engagement engages and releases from the state of obstruction with which the engagement heights 6 and the engagement crevice 7 engaged If lock out energization is carried out, this lock out energization is resisted and it is made to rotate by hand more than this predetermined rotation include angle If said predetermined disconnection include angle which the engagement heights 6 and the engagement crevice 7 are engaged again, and will be in a rotation lock condition can rotate flip 2 by hand and moreover releases its hold of this flip 2 It stops and the flip 2 is considered as the configuration which realized the fleece top condition which is not unsteady in the released location.

[0035] In this example, a mounting hole 14 is established in the base of the body section 1, the mounting hole 15 which adjoins this and a free passage condition is established also in the base of flip 2, and it is considering as the configuration which inserts the hinge equipment of this invention constituted as shaft-like parts in this mounting hole 14 and a mounting hole 15.

[0036] The caging 4 made into the baffle configuration through said mounting hole 15 is fixed to flip 2 (part II material 2) as the second connection section 4, and it is fixing to the body section 1 (part I material 1) through said mounting hole 14 by making into the first connection section 3 the lock out section 3 which blockades the end side of this caging 4.

[0037] Moreover, the engagement heights 6 allotted in said second connection section 4 (caging 4) are fixed to the inside point of this first connection section 3 (lock out section 3).

[0038] Moreover, the lock out section 17 was formed in the other end side of caging 4, and inside this lock out section 17, it countered with said engagement heights 6, and the engagement crevice 7 engaged mutually was formed, and this engagement crevice 7 is formed free [ slide migration in the engagement estrangement direction ] along with the guide rail 16 prepared in caging 4 while preparing in caging 4 at a baffle condition.

[0039] Moreover, while forming the coil spring 5 energized in the engagement direction as an engagement energization device 5 in the caging 4 between this engagement crevice 7 and said lock out section 17, when the engagement crevice 7 resisted said engagement energization device 5 on the occasion of engaging and releasing and moved in the estrangement direction, suppression bearing of the back of this engagement crevice 7 was carried out, and the friction spring 11 as a \*\* spring energized in the engagement direction is prepared. This friction spring 11 is arranged so that suppression bearing of the engagement crevice 7 which is going to desert in case it considers as the dome template-like friction spring 11 with which the center section bulged to the inside and engages and releases to it may be carried out.

[0040] In addition, although the deformation stroke of the friction spring 11 established the engagement energization device 5 apart from the friction spring 11 by this example in consideration of being always made to carry out [ a small thing and ] engagement energization in the state of engagement, if it sets so that bearing maintenance of the back of the engagement crevice 7 may be carried out in an engagement location at the time of engagement, it is not necessary to establish the engagement energization device 5.

[0041] Moreover, on the other hand, the torque spring 9 is formed in the base of the engagement heights 6 as a rotation energization device 9, and it constitutes from carrying out rotation energization of the caging 4 so that rotation energization of the engagement crevice 7 may be carried out to the engagement heights 6.

[0042] By making it a state of obstruction from an open condition, a twist is stored, and this rotation energization device 9 is constituted so that rotation torque may arise.

[0043] Moreover, while establishing the slide advice shaft 18 which engages with the central engagement shaft 17 of the engagement heights 6 in the center of the engagement crevice 7 and guiding slide migration of said engagement crevice 7 This slide advice shaft 18 is made tubed, it constitutes so that the actuation shaft 19 of the lock discharge control unit 8 may be inserted in and it may project towards the back of the engagement crevice 7, and it constitutes so that the swelling center section of the friction spring 11 may be pushed with this actuation shaft 19 and press deformation of the friction spring 11 may be carried out.

[0044] Namely, the lock discharge control unit 8 pushes the center section which bulged in the shape of [ of the friction spring 11 adopted as said elastic device 11 with the actuation shaft 19 which carries out push migration ] a dome, and it constitutes it so that it may be made to deform in said estrangement direction. In case the engagement crevice 7 carries out estrangement migration on the occasion of engaging-and-releasing rotation, it constitutes so that not the center section that bulged in the shape of [ of the friction spring 11 ] a dome but a periphery may be made to push and transform and suppression bearing of this engagement crevice 7 may be carried out.

[0045] When it explains concretely, furthermore, the lock discharge control unit 8 Constitute from pushing carbon button section 8A and an actuation shaft 19, and it constitutes so that press deformation of the center section of the friction spring 11 may be carried out in said estrangement direction with the actuation shaft 19 which carries out movable by pushing this pushing carbon button section 8A and said rotation lock condition may cancel. When the engagement crevice 7 deserts relatively to the engagement heights 6 because carry out relative rotation of said engagement crevice 7 by hand to said engagement heights 6 and engagement to the engagement heights 6 and the engagement crevice 7 engages and releases, The back configuration of the engagement crevice 7 and the swelling configuration of the friction spring 11 are set up so that the engagement crevice 7 which deserts may carry out press deformation of the not a center section but periphery of the friction spring 11. That is, in this example, the ring-like lobe 20 is formed in the back end side of the engagement crevice 7, the periphery perimeter of the friction spring 11 is pressed by this lobe 20, and it is designing so that press deformation may be carried out to back (the estrangement direction).

[0046] Therefore, although return thrust is set as sufficient strength to realize said fleece top condition by using the elastic device 11 as the friction spring 11 in this example, the discharge operating physical force was weak, ended, and since the push discharge by said lock discharge control unit 8 performs [ press in the center section of the friction spring 11 ], it has set up so that press deformation may be carried out and said rotation lock condition may be canceled also by the force in which of a finger is light.

[0047] Namely, the actuation lever 19 is inserted in in the slide advice shaft 18 of said engagement crevice 7 through the feed hole of said lock out section 3 by push-button section 8A which carries out press actuation with a finger. If it constitutes so that push projection may be carried out to the back of said engagement crevice 7, and the return spring 12 is resisted and push-button section 8A is stuffed into the inside Since the point of the actuation shaft 19 is considered as the configuration which carries out push deformation of the center section of the friction spring 11 through the engagement crevice 7, Even if it is the friction spring 11 which demonstrates strong return thrust, in order that the engagement crevice 7 may engage and release by the weak force, press deformation can be carried out to sufficient location, and automatic rotation can be carried out according to the rotation energization device 9.

[0048] Moreover, this engagement crevice 7 forms a V character-like crevice in the position of symmetry 180 degrees. Use this crevice as the engagement part with which the engagement heights 6 engage, and although it is the return thrust according [ the apical surface of the engagement heights 6 ] to the elastic device 11 to the top-face section 13 between this crevice, and the small energization force in the fleece top field which will be in an engaging-and-releasing condition, a pressure welding is carried out by the return thrust of the engagement energization device 5. Even if rotation energization of the rotation energization device 9 has arisen, unless it pushes by hand, it constitutes so that halt maintenance may be carried out.

[0049] Namely, unless predetermined distance press deformation of said friction spring 11 is

carried out in this example, engagement to the engagement heights 6 and the engagement crevice 7 does not engage and release. It will be in said fleece top condition. the friction spring 11 after engaging and releasing — \*\*, even if the apical surface of the engagement heights 6 and the top-face section 13 of the engagement crevice 7 carry out a pressure welding by the return thrust of the coil spring 5 of the engagement energization device 5 and the rotation energization force by said rotation energization device 9 arises On the other hand, said friction spring 11 by push discharge actuation of said lock discharge control unit 8 by the thing required for engaging and releasing to do for stroke part press deformation Without engagement to said engagement heights 6 and said engagement crevice 7 engaging and releasing according to said rotation energization device 9, and being in a fleece top condition, it constitutes so that the part II material 2 may carry out relative rotation at once automatically to the part I material 1 to a predetermined disconnection include angle.

[0050] moreover, in this example, in order for the fleece top to make it realize certainly, even if in other words return thrust is a little weak, as shown in the apical surface of the top-face section 13 of the engagement crevice 7, or the engagement heights 6 at drawing 10 , will form irregularity 21, a projection will be prepared, or sliding friction will increase, so that sufficient halt maintenance friction may arise — oh, it may carry out and you may form in a field. Moreover, in order to enlarge coefficient of friction in addition to this, a metal or different-species construction material is joined to the apical surface of the engagement heights 6 which carried out resin shaping, or the front face of the top-face section 13 of the engagement crevice 7, and you may make it devise a field condition.

[0051] Therefore, in this example, can carry out one-touch automatic rotation by the lock discharge control unit 8, and When relative rotation of the part II material 2 can be carried out to the part I material 1 by hand and it moreover carries out relative rotation by this hand The part II material 2 is not unsteady to the part I material 1, and the fleece top condition stopped in the location to which the hand was turned can be realized until it will be again engaged if lock out energization is carried out and it engages and releases until engagement to the engagement heights 6 and the engagement crevice 7 engages and releases for example.

[0052] Moreover, although contact pressure (return thrust) strong against realizing the fleece top is needed, the friction spring 11 can be adopted as an elastic device 11, and the strong contact pressure which realizes the fleece top with a simple configuration can be obtained.

[0053] Moreover, although the push discharge operating physical force of the lock discharge control unit 8 which vanishes return thrust of this elastic device 11 conversely (discharge) will become powerful and the strong pushing force will be needed for one-touch discharge if the elastic device 11 is moreover constituted, for example from a coil spring etc. The push discharge actuation by this point lock discharge control unit 8 It writes as the configuration make it make it not commit, so that adopt the dome mold swelling tabular friction spring 11 with which the center bulged as an elastic device 11, press this center section, it is made to fully deform and return thrust prevents rotation to the engagement crevice 7. The return thrust when enabling it to perform the lock discharge control unit 8 by light press actuation of a finger, since deformation by press in a center section can be performed by the weak force, rotating by hand on the other hand, and realizing the fleece top Since the engagement crevice 7 which deserts is made to press and transform not a center section but the periphery of the friction spring 11 and the return thrust by the engagement energization device 5 is also simultaneously produced in this example, sufficient return thrust to realize the fleece top can be obtained.

[0054] Therefore, although lock out energization is carried out and open rotation is automatically carried out by one-touch control When not performing this one-touch control, it can open and close by hand, and in that case, it is very easy to use, constituting so that it may be in the fleece top condition which carries out a rotation halt in the location to which the hand was turned, and, moreover, is using the friction spring 11. The configuration changed in the time of the press discharge for automatic rotation of the press location to the friction spring 11, and the fleece top while it is realizable with a still simpler configuration sake, Though it has the spring force in which the fleece top is realizable, the pocket type electronic equipment which used hinge equipment for the epoch-making hinge equipment list which can perform one-touch

discharge actuation by the light force with a finger (the operating physical force of a release button can be made into the minimum) can be offered.

[0055] In addition, this invention is not restricted to this example and the concrete configuration of each requirement for a configuration can be designed suitably.

[0056]

[Effect of the Invention] It can open and close by hand, since this invention was constituted as mentioned above, lock-out energization is carried out and it carries out open rotation automatically by one-touch control, but when not performing this one-touch control, since it will be in the fleece top condition which carries out a rotation halt in the location to which the hand was turned in that case, it becomes with the pocket type electronic equipment which used hinge equipment for the epoch-making hinge equipment list which is very easy to use.

[0057] That is, when do not perform this one-touch control and it is very easy using for the fleece top condition which carries out a rotation halt in the location to which the hand was turned in that case, being able to open and close by hand and becoming although it is the hinge structure which can carry out lock-out energization and automatic-disconnection rotation carries out by one-touch, it becomes with the pocket type electronic equipment used hinge equipment to an epoch-making hinge equipment list [ be / with an easy configuration / in the hinge connection moreover carry out such a switching action that is easy to use / it / realizable ].

[0058] Moreover, it is using a friction spring as an elastic device especially in invention according to claim 2. The configuration changed in the time of the press discharge for automatic rotation of the press location to a friction spring, and the fleece top while it is realizable with a still simpler configuration sake, Though it has the spring force in which the fleece top is realizable, one-touch discharge actuation serves as pocket type electronic equipment which used hinge equipment for the very epoch-making hinge equipment list which can realize hinge connection which can be performed by the light force with a finger with an easy configuration.

[0059] Moreover, in invention according to claim 3 to 9, it becomes hinge equipment which can realize this invention easily with a still easier configuration and which exceeded in practicability extremely.

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[Translation done.]

## \* NOTICES \*

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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DESCRIPTION OF DRAWINGS

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## [Brief Description of the Drawings]

[Drawing 1] It is the explanation perspective view of the busy condition of this example.

[Drawing 2] It is the explanation perspective view of this example.

[Drawing 3] It is the explanation decomposition perspective view of this example.

[Drawing 4] It is an explanation sectional view in the state of obstruction by which lock out energization of this example was carried out.

[Drawing 5] It is an explanation sectional view in the fleece top condition at the time of rotating by the hand of this example.

[Drawing 6] It is an explanation sectional view in the condition of carrying out automatic rotation by push discharge actuation of this example.

[Drawing 7] It is the explanation perspective view of an important section showing the relation between the elastic device 11 of this example, and the engagement crevice 7.

[Drawing 8] It is the amplification explanation sectional view of an important section in which showing the relation between the engagement heights 6 of this example, the engagement crevice 7, and the elastic device 11, and showing a state of obstruction, a fleece top condition, and the re-engagement condition in an open position.

[Drawing 9] It is the amplification explanation sectional view of an important section in which showing the relation between the engagement heights 6 of this example, the engagement crevice 7, and the elastic device 11, and showing a state of obstruction and the condition by push discharge actuation of carrying out automatic rotation.

[Drawing 10] It is the explanation top view of the engagement crevice 7 showing the means for increasing coefficient of friction of this example.

## [Description of Notations]

- 1 Part I Material
- 2 Part II Material
- 3 First Connection Section
- 4 Second Connection Section
- 5 Engagement Energization Device
- 6 Engagement Heights
- 7 Engagement Crevice
- 8 Lock Discharge Control Unit
- 8A Pushing carbon button section
- 9 Rotation Energization Device
- 10 Stop Step
- 11 Elastic Device, Friction Spring
- 13 Top-Face Section
- 19 Actuation Shaft
- 20 Fleece Top Field

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[Translation done.]